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☐ 1: Gene 1989 Sep 1;81(1):55-64

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Firefly luciferase as a reporter enzyme for measuring gene expression in vegetative and symbiotic *Rhizobium meliloti* and other gram-negative bacteria.

Palomares AJ, DeLuca MA, Helinski DR.

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Department of Biology, University of California, San Diego, La Jolla 92093.

A DNA segment carrying a cDNA copy of the luciferase gene (*luc*) of the North American firefly *Photinus pyralis*, fused to the lambda PR promoter and expressed in *Escherichia coli* [de Wet et al., Proc. Natl. Acad. Sci. USA 82 (1985) 7870-7873], was inserted into a broad-host-range plasmid vector and established in a variety of Gram-negative bacteria. Luciferase activity, expressed from the lambda PR promoter, was detected in both intact cells and extracts prepared from cells of strains of *Rhizobium meliloti*, *R. phaseoli*, *R. fredii*, *Pseudomonas aeruginosa*, *Agrobacterium tumefaciens*, *Acinetobacter calcoaceticus* and *Azotobacter vinelandii*. The highest levels of activity, determined by measurements of both intact cells and extracts, were observed for *P. aeruginosa* and the three species of *Rhizobium* examined. Expression of luciferase activity also was relatively high in *R. meliloti* bacteroids of mature alfalfa nodules. This activity was readily detectable in intact nodules using x-ray film or in extracts prepared from purified bacteroids.

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